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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

MOK ET AL

Serial No. 09/361,626

Group Art Unit: 1724

Filed: July 27, 1999

Examiner: Cintins

For: PROCESS FOR REMOVING ALUMINUM SPECIES FROM ALKALI METAL HALIDE BRINE SOLUTIONS

October 5, 2001

RESPONSE

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Hon. Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

In response to the Office Action dated June 5, 2001, reconsideration of this application is requested.

The Examiner has maintained the rejection of claims 1-7, 9 and 10 (i.e. all claims) as unpatentable over Nagy. However, the Examiner is requested to reconsider the rejection as it is respectfully submitted that the applicants' method does provide results which would not be obvious from Nagy. In particular, there is no motivation in Nagy to make the changes needed in the reference method and no reason to expect the improved results the applicants obtain.

In maintaining the rejection on Nagy, the Examiner recognizes that Nagy does not disclose the applicants' magnesium-to-aluminum molar ratio but he takes the position that "the exact magnesium to aluminum molar ratio in the reference process

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is not seen to materially affect the overall results of this process, or to produce any new and unexpected result; and is therefore deemed to be an obvious matter of choice, which is insufficient to patentably distinguish the claims".

With respect, however, it is urged that it is the applicants' finding that the magnesium-to-aluminum molar ratio does indeed materially affect the overall results in an unobvious fashion.

More specifically, the applicants have found that Al removal efficiency is closely related to the working ratio of Mg to Al and also to the initial Al concentration present in the brine solution to be treated. This is shown by the applicants' experimental evidence of record. For example, the experimental results show that a Mg/Al molar ratio of 1.1 with an initial Al content at 0.5 ppm generated only 12-24% removal efficiency after 30 minutes, depending on the amount of NaOH used (see Experiment No. 1), whereas a molar ratio of 4.4 with the same 0.5 ppm Al and NaOH concentrations produced 52-68% efficiency. The art does not suggest this. Furthermore, the applicants have found that Al removal efficiency can be further improved if the Mg/Al ratio is also increased as called for in the applicants' claims. Nagy does not provide any suggestion of this.

It is noted that one of the reasons the Examiner gives for viewing the applicants' experimental results as non-persuasive is that the results are not submitted in declaration form. An appropriate declaration setting forth these results will be submitted if the Examiner is otherwise satisfied as to allowability of the claims.

The Examiner's other objection to the applicants' experimental results is that they purportedly are not commensurate in scope with the claim limitations. However, it is respectfully submitted that the experiments are in fact appropriate for

comparison with the Nagy disclosure and otherwise supportive and representative of the present claim scope.

The Examiner refers to the applicants' Experiment No. 3 as showing satisfactory results with a molar ratio of Mg/Al of 22.2, i.e. outside the applicants' claimed range of 5-20/1. The applicants agree that the high molar ratio of 22.2 shown in Experiment No. 3 gives good removal efficiency. However, this is not a valid reason for rejecting the applicants' claims. The higher Mg/Al molar ratio is not prior art but, in any case, the applicants have limited their claims to the recited lower Mg/Al molar ratio because from an actual practical standpoint, the amount of Mg used in the process has to be limited as the increasing solids contents in the resultant mixture would adversely affect the normal chlor-alkali operation.

It is noted that, in Nagy's results, an Mg/Al molar ratio of 2.8 with initial Al concentration at 1.0 ppm and Mg content of 2.5 ppm produced absolutely no removal of Al after 20 minutes and Nagy clearly teaches that a magnesium level below 5 ppm is ineffective for removing undesirable metallic impurities. However, the results with the applicants' method using the same Mg/Al ratio (2.8) but using only 0.5 to 1 ppm Mg, significant removal efficiency was realized when operating according to the applicants' invention and including NaOH concentration as claimed. See applicants' Experiment No. 1. Nagy is not in any sense suggestive of the applicants' results when operating according to the applicants' method conditions.

The Examiner is requested to reconsider the Section 103(a) rejection in view of the foregoing. It is respectfully submitted that the evidence presented represents a reasonable comparison with Nagy using a representative variation of conditions consistent with the applicants' invention. While results obtainable using an Mg

concentration of closer to 5 ppm than the illustrated 2.0 ppm (Experiment No. 3), the evidence presented in support of the applicants' invention is thought to represent a realistically fair comparison between the applicants' invention and Nagy. Clearly, for example, Nagy provides no indication that a higher Mg/Al molar ratio, particularly as coupled with the applicants' Mg concentration and alkali metal hydroxide concentration would provide effective aluminum removal efficiency. Nothing in Nagy is suggestive of the importance of this combination of specific features as called for by the applicants for the removal of Al in a method of the type claimed herein.

Accordingly, favorable reconsideration is requested.

Respectfully submitted,

PILLSBURY WINTHROP LLP

By_____
Paul N. Kokulis
Reg. No. 16773

PNK:mh
1600 Tysons Boulevard
McLean, Virginia 22102
Phone: (703) 905-2118